

**PARTIAL STROKE TEST OF EMERGENCY SHUTDOWN VALVE -  
METSO NELES**

by

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Dissertation submitted in partial fulfillment of  
the requirements for the  
Bachelor of Engineering (Hons)  
(Electrical and Electronics Engineering)

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CERTIFICATION OF APPROVAL

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December 2009

## CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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(SITI FARHANA BT SUDARMAN)

## **ABSTRACT**

Potential disasters at an industrial processing plant may include an accident resulting in a massive release of toxic materials, an uncontrollable reactant, a devastating explosion or any combination of the above. All processing plant must be guarded from all potential disaster scenarios. Therefore , emergency shutdown valves has to be sure be operated with fault-free as the valves are kept idle in open position for long periods and are designed to close and keep tight in case of a hazard occur. Regular checking has to be performed in order to guarantee the function of the valves. Emergency Shutdown valves have been tested at unit turnaround, using a Full Stroke Testing and Partial Stroke Testing to demonstrate the performance. The scope of this project is to verify the technology needed for Full Stroke Testing and Partial Stroke Testing in order to ensure the performance of the Emergency Shutdown valve. The testing is simulated by using WideField2 Software (YOKOGAWA) for Full Stroke Test and FieldCare Software (Metso Neles) for Partial Stroke Test. Partial Stroke Testing can be a good complement to Full Stroke Testing as it reduces the required Full Stroke Testing frequency and associated operational impact. Partial Stroke Testing will detect failure of Emergency Shutdown valves without disturbing the process flow. Testing is conducted for sixth times. The valve status and its response to mechanical movement during the test are monitored. Valve performance trend is analyzed after each partial stroke test to find whether there is any potential of valve failure. The result of valve test, pneumatics test, breakdown pressure and load factor are being taken into consideration in analyzing the performance of the emergency shutdown valve.

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## **LIST OF ABBREVIATIONS**

FST	Full Stroke Testing
PST	Partial Stroke Testing
VG	ValvGuard
PLC	Programmable Logic Controller
RCI	Remote Communication Interface
HART	Highway Addressable Remote Transducer
SIL	Safety Integrity Level
PFD	Probability of Failure in Demand
DCS	Distributed Control System
ESD	Emergency Shutdown
FDT	Field Device Tool